F-19

STEALTH FIGHTER

MICRO PROSE™

SIMULATION • SOFTWARE

F-19 Stealth Fighter is MicroProse's simulation of the most sophisticated aircraft design in the world. You control the modern high-tech wizardry of the most formidable fighting plane in the world today: the all-but-invisible *Stealth Fighter*.

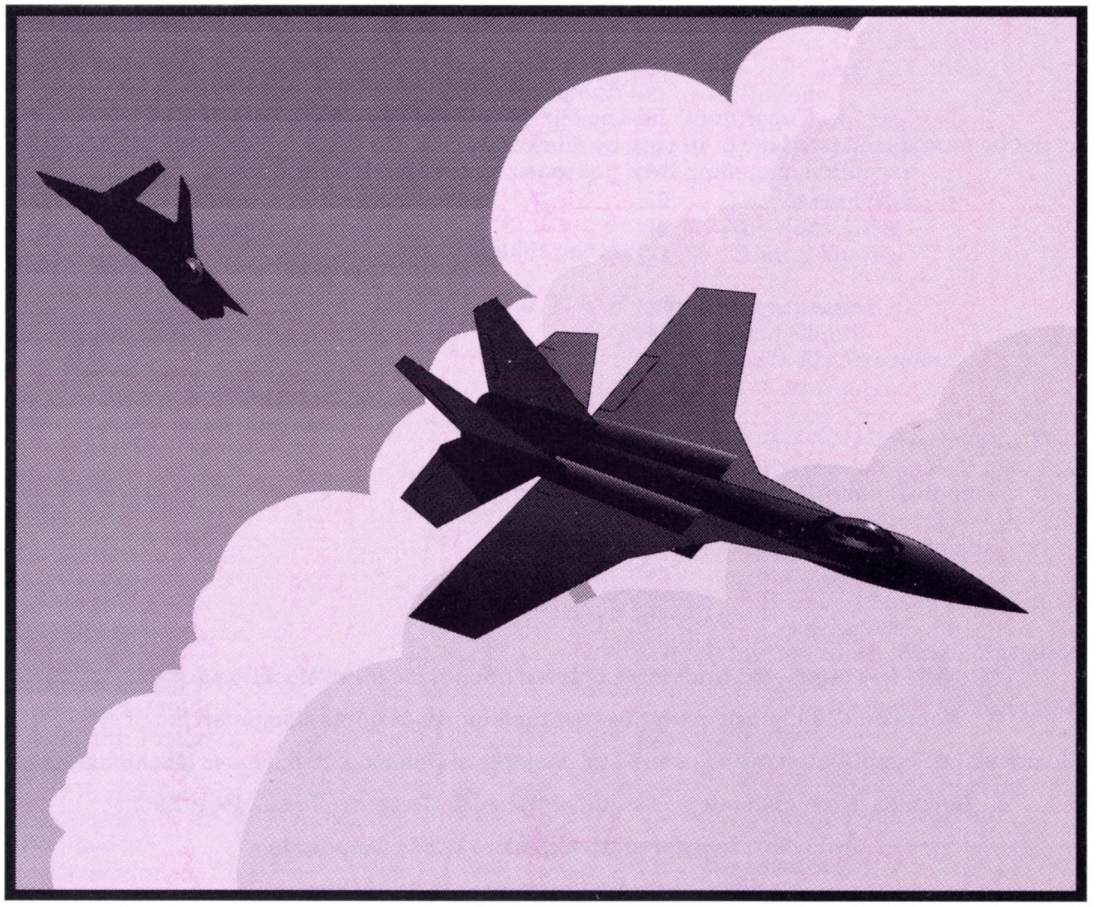
F-19 Stealth Fighter gives you full aerodynamic control and stunning 3-D out-the-cockpit graphics combined with a realistic multi-mode HUD (head-up display). Inside your cockpit is just as high-tech, with two multi-function CRTs that can show eight different screens. There are over 50 different controls for the airplane, including a choice of 17 different weapons, plus 5 built-in defense systems.

F-19 Stealth Fighter includes no less than 11 different viewing perspectives, five from within the cockpit, and six more from outside the aircraft. These include the innovative TACTICAL VIEW that keeps both your plane and its target in view at all times. Also select between normal and "fish eye" wide-angle views at any time, or zoom in and out, just like a movie camera. All this camerawork is for good purpose: you'll see roads, rivers, bridges, towns, cities, fields, hills, mountains, airfields, oil wells, refineries and storage tanks, SAM sites, silkworm SSM batteries, warships, freighters, over a dozen different types of aircraft, and much more.

F-19 Stealth Fighter includes realistic missions in four of the world's most sensitive areas: Libya, the Persian Gulf, the North Cape, and Central Europe. You can also choose the level of conflict in the world —are you flying clandestine spy missions in the Cold War, or charging forward with weapons blazing in the middle of World War III? A "scenario generator" makes each assignment a fresh new challenge.

F-19 Stealth Fighter is easy to learn but hard to master. It includes a wide choice of realism factors that ease novice pilots into the air. You can select "training" missions where enemy weapons have no effect, and/or a "no crash" flight mode that protects you from otherwise fatal errors! Of course, when you're ready for the challenge, select fully realistic flight and go up against the toughest pilots and defenses in the world. In this simulation, all the choices are yours.

F-19
Stealth Fighter



MicroProse Software, Inc.

F-19 Stealth Fighter

Computer Simulation

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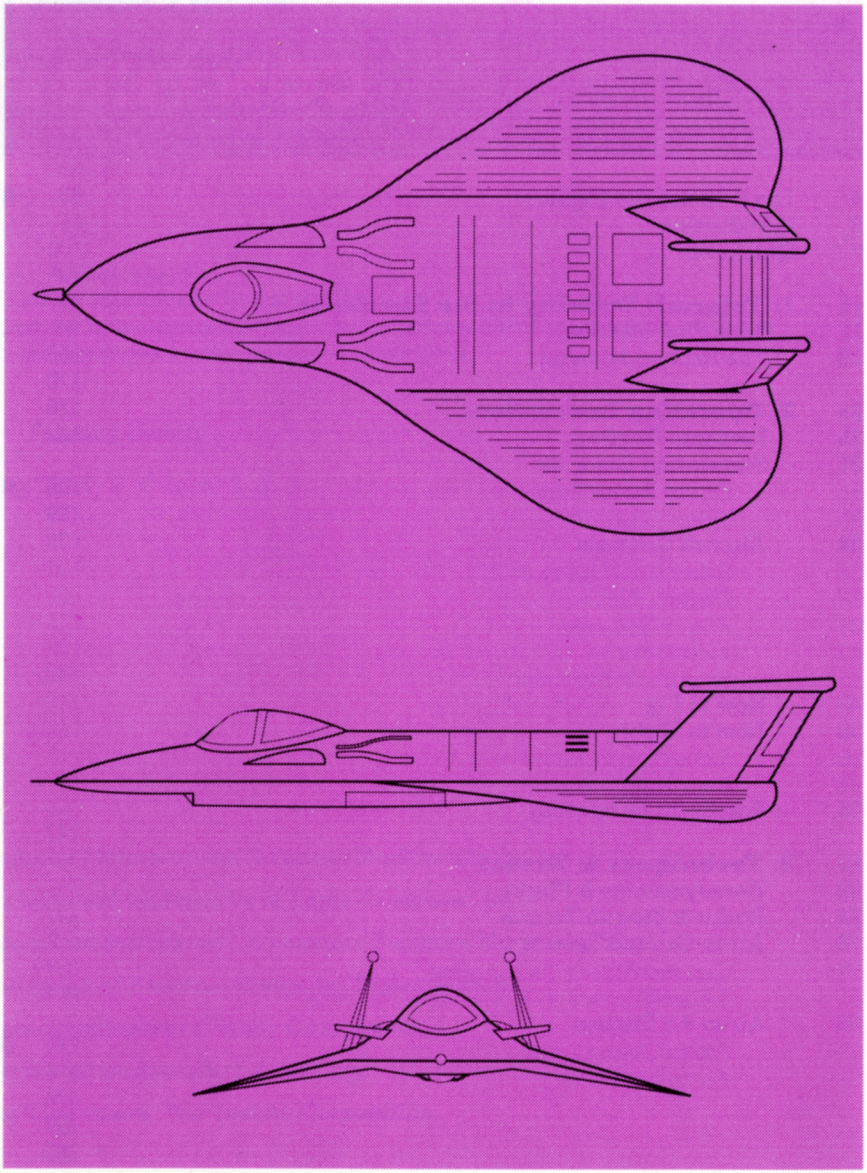
F-19 Stealth Fighter

Designer/Manufacturer: Lockheed, USA
Role: Stealth strike fighter
Crew: One
Wing Span: 31'8"
Overall Length: 59'0"
Overall Height: 13'2"
Mission Weight at Takeoff: 17 tons
Engine(s): Two General Electric F404-GE-100A turbofans (with no afterburners) for 34,000 lbs thrust
Range: 520 miles
Ceiling: 64.000'
Maximum Speed in level flight at 0': 530 kts (Mach 0.8)
Maximum Speed in level flight at 36,000': 640 kts (Mach 1.1)
Armament: one M61A1 6-barrel 20mm cannon, four internal weapon bays with maximum combined load of 6,000 lbs
Air-to-Air Radar Quality: No radar; medium range FLIR/TV optical fire control system
Maneuverability: Fair to good

Created at the Lockheed 'Skunk Works' in Burbank, California, this novel aircraft sacrifices almost everything to a nearly invisible radar signature. The shape minimizes radar reflections. A large quantity of RAM (Radar Absorbent Material) panels, wedges and coatings are located on the ventral and dorsal surfaces, including the wings. All leading edges are cased in heat-resistant ceramics for minimum infrared signature, while engine exhausts are directed through low-signature slats.

The aircraft is designed for all-weather reconnaissance and strike missions, but can use its internal 20mm cannon, AIM-9 Sidewinder, or AIM-120 AMRAAM missiles for air-to-air interception and combat. The latest version uses a sophisticated zoom FLIR/TV/laser target tracking system that allows the pilot to see a close-up picture (either TV or thermal) of the target at all times, regardless of angle.

The aircraft is air-transportable in C-5A Galaxy transports, and can be launched and recovered from US Navy aircraft carriers.



Introduction

On a moonless night a huge C-5A Galaxy transport plane touches down in Saudi Arabia and taxis to a distant hanger guarded by DIA (Defense Intelligence Agency) operatives. A large black object is rolled from the Galaxy into the hangar. Under red night-lights the hydraulic whine of unfolding wings is counterpointed by the hum of fuel tanker trucks pumping aviation gas, while sweating ground crewmen hoist bombs and missiles into weapons bays. As the Galaxy rolls away, an Air Force pilot climbs into the black plane, puts on his helmet, and begins preflight checkout. Minutes later the distinctive whine of F404 turbofans fills the hanger. A strange, rounded shape noses out of the dark hangar doorway and onto a runway. A hand pushes the throttle to full forward. With a roar the two big turbojets hurtle the craft airborne. Another Stealth Fighter mission has begun.

Tomorrow the U.S. Navy is performing retaliatory strikes against Iranian-sponsored terrorism. The Iranian planes at the Shiraz airfield must be rendered harmless tonight!

The dark waves of the Persian Gulf roll 200 feet below the wings. Off to the left are the twinkling lights of dueling Iraqi and Iranian artillery. Blue light bathes the cockpit: enemy radar is awake tonight, but the American fighter is returning a signal too weak for the enemy radar to perceive.

Two hundred miles away, 30,000 feet over the Saudi Arabian desert, an American crewman sits at one of the 22 consoles on a E-3C "Sentry" AWACS plane. The powerful AWACS radars and signals processors are monitoring the entire Persian Gulf and southern Iran areas. The crewman's fingers dance over the keyboard as he describes aircraft takeoffs, movements, and landings, as well as enemy radar and radio activity. Deep inside its massive computers, the AWACS encodes the message and transmits it in a fast, tight burst.

Dancing lights play across a HUD 200 feet above the water. As his computers decode the radio burst the lone Air Force pilot reads the incoming information. His cockpit CRTs automatically update also. He makes minute adjustments and examines his consoles once more. Yes, very good. He's timed the adjusted flight path so he'll pass behind the enemy fighter patrol, their nose radars looking away from him.

Minutes later, he accomplishes just that, then plunges into the desolate mountain valleys of southern Iran. Mountain goats and sheep scamper across the desolate highlands as a black roar passes overhead, twisting and turning to follow the valley floor.

At last he passes out of the last mountain range. Then a yellow light blinks: they got a good radar return there! Will they alert their SAMs and interceptors? It's all academic as the fighter's nose rolls downward, aiming at the military airfield on the outskirts of Shiraz.

The throttle goes to the wall and a rolling sonic boom follows behind the

dark avenger. Warnings blink as Iranian radars suddenly see an intruder directly overhead. Sirens erupt, sleepy SAM crews leap to their radar consoles while fighter pilots tumble out of bed. Above, the pilot flips arming switches. Targeting symbology flashes up on his HUD while underneath bay doors whine open. A weapons pylon extends into the night sky, a stubby Maverick missile's FLIR sensor scanning until the pilot sees the distinctive heat signature of a HAWK battery controller. The missile's brain locks onto the image and its engine flares bright in the sky. Simultaneously below the battery commander launches his first HAWK surface-to-air missile at the intruder.

The HAWK's control-guidance beams cause new warnings in the cockpit, followed moments later by a strident klaxon. The missile is just seconds away. A cloud of aluminum chaff erupts behind the intruder. The HAWK attacks the cloud and explodes far behind the stealth fighter. Seconds later the slower-travelling Maverick hits the SAM controller's bunker, wrecking its radar and communications gear, disabling the entire battery.

The black fighter rolls steeply, airbrakes out. The sonic boom roars ahead of it, crashing over the airfield like the thunder of the gods. Five hundred feet above the tarmac two Durandals drop from a weapons pylon, chutes springing free at the tail of each. The bombs nose downward, floating in air over the runway. Then rocket motors explode and the bombs leap toward the ground, armored heads cutting through the thick concrete. Three feet down the warheads explode, hurling slabs of concrete in all directions.

The American pilot loops around and dives over the runway again. Two huge craters sit squarely in the middle, while nearby a number of carelessly parked jets are crumpled under pieces of concrete. A major unit of the Iranian air force is now grounded, unable to fly until lengthy repairs are made. In a single blow over forty enemy aircraft have been rendered harmless.

The black plane roars away into the mountains at 200', closing his bay and switching off jammers. To the military search radars all around, watching in helpless fury, the intruder seems to disappear. Interceptors vectoring in from other bases block the airwaves with confused chatter. The American pilot smiles and throttles back for the slow cruise home, another F-19 Stealth Fighter mission accomplished.

Quickstart

You have three options when learning to fly your F-19 Stealth Fighter.

Try & See Method: You can just dive in and try things out, referring to this manual and the Technical Insert as necessary. In this case we strongly suggest that you (a) use the keyboard overlay, and (b) glance over "Aircraft Controls" in Part II (pages 34-48) to familiarize yourself with the HUD and cockpit. As you fly, you'll find Part II in general to be an excellent reference aid. Be warned, the F-19 is a complex aircraft. Sooner or later you'll have to look at the manual.

Tutorial Method: You can use the "Quickstart" method described below for your first flight, or you can work through the more detailed tutorial on pages 11 through 23. If you like to be guided through a situation, we suggest the full tutorial. Note that the tutorial urges that you at least skim through Part II (pages 34-48)

Study Method: You can study the actual controls and operating instructions for the craft, then attempt to fly it. This is what real pilots do (or should do). In this case, read all of Part II (pages 34-48) before flying, and refer back to the section as necessary. You can use the tutorial on your first flight, or skip it, as you prefer. However, we suggest a practice mission as your first flight.

Abbreviated Tutorial

Setup & Preflight Options

1. Install the game as suggested onto floppy disks or hard disk (if you have one). See "Installation" in the Technical Supplement for details.

You can skip installation, but if you do none of your records can be saved.

2. Load the Simulation: see "Loading Instructions" in the Technical Supplement for details and specific commands.

3. Answer the Aircraft Identification Quiz: Check the back part of this manual ("Warplanes", pages 157-169) to see what aircraft is illustrated. If you give a wrong answer, you are automatically sent for training. If you give the correct answer, you are given a complete selection of all options.

4. Log onto the Pilot Roster: Following the instructions on the screen, erase one of the pilots on the roster and type your name. Enter the name by tapping the "Return" or "Enter" key.

5. Accept the Current Mission: As a new pilot, your first assignment is a standard training mission. We suggest you accept this challenge. The default options are:

- Libya region
- Conventional War situation
- Strike Training as your mission
- Green Opponents
- No Crash flight realism

6. Intelligence Briefing: Be sure to highlight and read both of the following options:

- Mission Targets
- Flight Plan

These describe your objectives, takeoff and landing points, and the Rules of Engagement (what you should and shouldn't destroy). See page 29 for a more detailed description of the Intelligence Briefing screen, its options, and information.

7. Arming Complete: Use the default armament, so select the "Arming Complete" option on this screen.

8. Begin Mission: Select this option to start your training mission.

Flying the Mission

If you selected the starting options described above, you're flying a training mission. This is just right for your first flight, since in training enemy weapons do no damage. On the first mission we recommend you concentrate mainly on flying, with a bit of simple weapons use, and ignore all those enemy planes and missiles buzzing around.

A Quick Checkout: Place and examine the keyboard overlay. This device is an invaluable aid in flying your F-19.

Find the *Pause* key command on the overlay. This command is always useful while learning.

Skim through "Aircraft Controls", pages 34-48 of this manual. They describe the cockpit and HUD (head-up display). You'll need some familiarity with these before you fly.

This first mission is exactly the mission described in the "Tutorial" (pgs 11-23). You're invited to follow the step-by-step instructions of the tutorial.

You are also invited to look at the Simulation Controls, especially the Out of Plane Views (see pgs 31-33). Experiment with these on your first few flights. You'll find the views quite interesting, and often quite useful.

1. Takeoff: Power up the engines (tap the *Max Pwr* key) and release the Brake (tap the *Brake* key) to fire the aircraft carrier catapult. Once your aircraft passes stall speed (stall speed bar drops below the center tickmark on the left-hand HUD gauge) you can pull up the nose. You must do this as you clear the carrier's deck, or else you'll fall into the sea. Tap the *Gear* key to retract your landing gear.

See "How to Fly" (page 49) for a more detailed description of takeoff procedures.

2. Fly to Your Target: Turn on the autopilot (tap the *Autopilot* key) to get on course to your target. Every time you touch the control stick, the autopilot automatically turns off. Therefore, you can experiment a bit with flight on the way to the target, then turn the autopilot on once more to get you back on course.

You'll be using your AGM-65D Maverick missiles to attack the target, so you might want to read "How to Fight", especially page 57, which describes how to operate this weapon.

Tap the *Ordnance* key to see which weapons are aboard your plane. Next find the *Select Ordnance* key and tap that, rotating through the various weapons until AGM-65D "Maverick" is highlighted. You'll notice its name also appears in the lower left corner of the HUD.

3. Attack the Target: When you get close to the Libyan coast, switch the HUD to air-ground mode (tap the *HUD Modes* key until the bottom-center label of the HUD is "AIR-GROUND") and turn on your tracking camera (tap the *Cam Ahead* key). If your primary target, the Tripoli Depot, does not appear in the lower right cockpit CRT, tap the *Select Target* key until it does.

Up on your HUD, you'll notice a box appears around an area of ground when the tracking camera finds the target. As you get closer, the box changes to a circle and the CRT screen shows the words "Missile Lock". Your Maverick missile is now locked on and ready to fire.

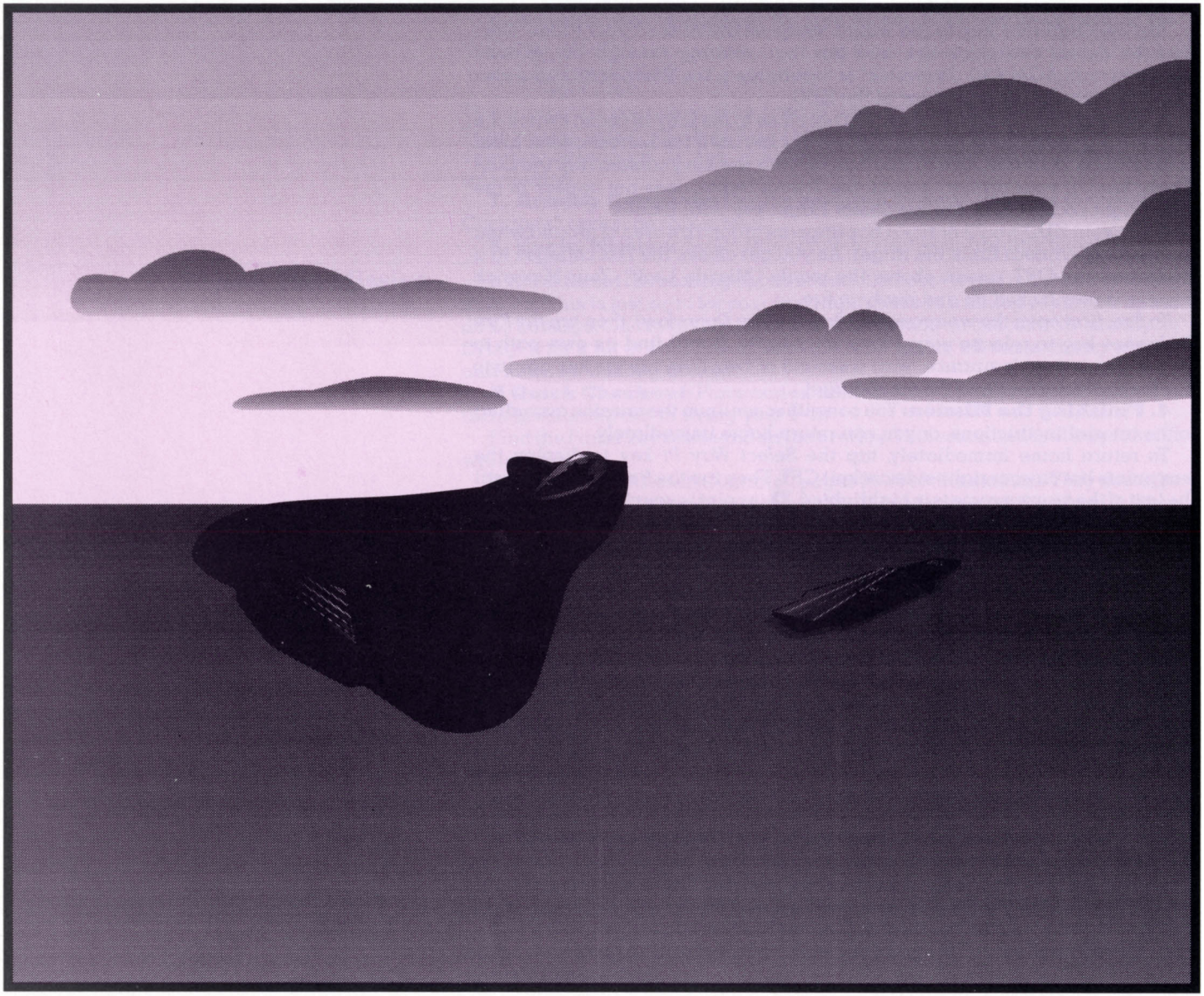
To fire, first open the weapons bay (tap the *Bay Doors* key), then tap the *Fire Ordnance* key to release your Maverick missile. It will find its own path to target. If you want insurance, wait a second or two, then tap the key again to fire the second missile at the same target.

4. Finishing the Mission: You can either continue the mission according to the tutorial instructions, or you can return home immediately.

To return home immediately, tap the *Select Way Pt* key to display the waypoints list on your right-side cockpit CRT. Then tap the *Next Point* key until the last of the four waypoints is highlighted. This point is your final destination, your landing strip. Now that the proper waypoint is set, you can tap the *Autopilot* key. The autopilot will turn the plane onto course for home.

As you approach the island of Sicily, switch the HUD to navigation mode (tap the *HUD Modes* key until the "NAV" label appears in its bottom center) and return to using the tracking camera (tap the *Cam Ahead* key once more). This will show the local airfield on the right-side cockpit CRT.

Landing this hot jet is tricky. However, if you follow the instructions on pages 54-55 you've got a good chance. Fortunately, the simulation is set in "No Crash" mode, so you'll survive a poor landing too. To end the mission, make sure the plane is stopped by putting the brakes on (tap the *Brakes* key) and then turn off the engines (tap the *No Pwr* key).



TUTORIAL 1

Your First Mission

This tutorial is designed to be your first mission. Flying this tutorial is not required. It's purely a convenience. For a faster entry into your first game, turn to "Quick Start" on page 7. If you prefer to study the aircraft before you fly it, go directly to Part II, starting on page 25.

In either case, before you start the simulation you may wish to install it on either floppy disks or a hard disk (see "Installation" in the Technical Supplement for details). You can run the simulation without installation, but no information is saved.

Now load the installed game (or the original disks, if you didn't install it) into your computer. See "Loading" in the Technical Supplement for details.

Your first mission is a practice strike against a SAM radar installation guarding the city of Tripoli, in Libya.

Terminology

Keys: Each key control has a name in *italics*, which appears on the keyboard overlay. A master list appears in the Technical Supplement.

Controller refers to the pointing device used by your computer. This may be a mouse, joystick, or cursors keys, depending on your hardware.

Selector refers to the mouse button, joystick trigger, return key, or enter key, depending on your hardware setup. See the Technical Supplement for details.

During flight, the function of joystick and mouse buttons are defined in the Technical Supplement. For example, on a typical two-button joystick, the first button acts as the *Fire Cannon* key, the second as the *Fire Ordnance* key.

Preflight Briefing Options

Answer the Aircraft Identification Quiz: Check pages 157-169 of this manual to see which aircraft is illustrated. Although a correct answer is not necessary for training missions, it's wise to acquire good habits.

Log onto the Pilot Roster: Following the instructions on the screen, use the *Controller* to select a name to erase, press the proper key to erase it, and type your name. Finish entering your name by tapping the "Return" or "Enter" key.

Accept the Current Mission: As a new pilot your first assignment is always this training mission. Use the *Controller* to highlight Accept Mission and then press the *Selector*. The tutorial training mission uses the following selections: *Libya* region, *Conventional War* situation, *Strike Training* as the mission category, *Green* opponents, and *No Crash* flight realism

Intelligence Briefing: The briefing map shows the general topography of the area, your takeoff point (T), your primary (P) and secondary (S) targets, and your landing point (L).

Be sure to highlight, select and read each of the following options:

- Mission Targets
- Flight Plan

These describe your objectives, takeoff and landing points, and the Rules of Engagement (what you should and shouldn't destroy).

A wise pilot also investigates the other options. If you wish to, see "Intelligence Briefing" on page 29 for details.

Arming Complete: You'll use the default armament, so highlight and select the *Arming Complete* option on this screen.

Begin Mission: Highlight and select the *Begin Mission* option to start your training mission.

Helpful Hints

No Danger: In practice missions, enemy weapons do no damage. You can safely ignore enemy aircraft and missiles. In addition, the "No Crash" selection means you cannot crash into the ground and will "bounce" over any hills you hit.

Furthermore, you have an automatic radar altimeter that tries to keep you above 200'. However, it only makes mild corrections, and is therefore helpless if you make truly wild maneuvers.

"Pause": To use this tutorial best, pause the simulation and read just the next few paragraphs, then "un-pause" and resume action for a short period. Whenever you're confused, just pause. Note that tapping any key (except pause) will "un-pause" and resume the action.

Resupply: In training scenarios (only) you can get an infinite supply of fuel and ammunition. Each time you tap the *Resupply* key, your fuel tank is filled to maximum and your ammunition is increased to the maximum possible level. This option is especially useful in target practice.

A Light Touch: Use a light touch on the *Control Stick*. The most common pilot error is a "ham-fist" on the stick, throwing the plane around the sky in uncontrolled abandon. Only emergencies should cause you to "peg" your stick (push it up against the stoppers, beyond which it cannot move).

Chasing the Gauges: When you roll an aircraft left or right, pitch it up or down, change the throttle, the flaps, or the brakes, it takes awhile for the plane to "settle out". Good pilots fly by making a change, then wait a couple of seconds to see the results. If you don't, you'll just "chase gauges" that are themselves still changing.

Airspeed settles out much more slowly than other settings. It takes time for your plane to build up velocity or lose momentum in level flight.

Familiarization: the Cockpit and the HUD

The Controls: Place the appropriate keyboard overlay on your computer keyboard. It shows all the controls for your F-19.

The HUD: The upper half of your screen represents the transparent HUD (head-up display), through which you can see the world beyond. The various symbols and numbers are described on pages 35-37.

The HUD has three operating modes: NAV for navigation, AIR-AIR for aerial combat, and AIR-GROUND for ground attacks. Tap the *HUD Modes* key to toggle through the three settings. Also note that in the AIR-AIR and AIR-GROUND modes the exact symbols depend on the current ordnance. Tap *Select Ordnance* to toggle through your weapons. If you're unsure of what weapons you have on board, tap the *Ordnance* key to see a graphic display in your cockpit.

The Cockpit: The lower half of your screen represents the cockpit of your aircraft. The various elements are described on pages 38-39. We suggest you toggle through the various CRT displays to get familiar with them.

The left-side CRT has two different map displays. Tap the *CRT Maps* key to toggle between them.

The right-side CRT either shows a camera view or a data screen, a you prefer. The data displays include:

Data key: data on target you're tracking.

Ordnance key: the weapons currently in your weapons bays.

System Damage key: which systems (if any) are damaged.

Select Way Pt key: list of the current INS waypoints, including the one you're currently being steered toward.

Change Way Pt key: list of the four INS waypoints, which you can change on the satellite/radar map (on the other CRT).

Reset Way Pt key: resets waypoints to the initial defaults.

ILS key: toggles instrument landing system graphics on and off the HUD.

Mission key: brief summary of your mission order.

The CRT camera views are a zoom TV (day) or FLIR (night) image of your target, with its name, range and bearing superimposed. The camera is limited to 80-100 km range (less at night). You have these viewing options:

Cam Ahead key: aims cameras at nearest standard target ahead.

Cam Rear key: aims cameras at nearest standard target behind.

Cam Left key: aims cameras at nearest standard target to left.

Cam Right key: aims cameras at nearest standard target to right.

Select Target key: toggles through all standard targets in current direction.

Designate New Targ key: aims forward camera at nearest target (any type) ahead. For more information on the tracking camera system, see pages 43-44.

Takeoff

Your mission starts aboard the aircraft carrier *America* sailing on a southerly course in the central Mediterranean. The preflight checklist for your F-19

Stealth Fighter is:

Check your INS system. Tap the *CRT Maps* key to display the satellite/radar map on your left-side cockpit CRT. Next tap the *Select Way Pt* key to display the INS waypoints on the right-side CRT. Look up on the HUD and note on the heading indicator the location of the INS Direction Indicator. You must fly in this direction to reach the first waypoint.

Check Armament: Check your ordnance (tap the *Ordnance* key) on the right-side CRT. As you use the *Select Ordnance* key to toggle through the weapons, note the active weapon in the lower left corner of the HUD.

Extend the Flaps by tapping the *Flaps* key. Note the "FLAPS" indicator in the lower right corner of the HUD. Flaps give you more lift during takeoff.

Check the Catapult System: When launching from an aircraft carrier, as you are now, the brakes must be set. This represents attaching the aircraft to the deck's steam catapult. If the HUD does not show "BRAKE" in the lower right corner, tap the *Brake* key to set the brakes and engage the catapult.

Start the Engines: Turn on your engines by tapping the *Max Pwr* key. Notice the throttle power indicator rising on the far left side of the cockpit.

Activate Catapult: When the throttle indicator shows maximum power, tap the *Brake* key. This releases the brakes and catapult, hurtling you off the deck.

Accelerate Past Stall Speed: As you zoom down the deck, watch the speed scale (left side of the HUD) very carefully. A colored bar on that scale will gradually drop down. This is the stall speed indicator. When the stall speed bar drops below the center tick on the scale your plane is past stall speed. You are travelling fast enough to get into the air.

Climb: Once you're more than 10 kts faster than the stall speed, pull back on the stick a bit to point your nose upward. Be firm, but don't pull all the way. Once the nose is skyward, release the stick. Watch the altitude scale on the right side of the HUD: you'll start climbing. Don't climb so steeply you lose sight of the horizon. That can cause a stall.

You must start climbing by the time you reach the end of the carrier deck. Otherwise you'll plunge into the sea.

Retract Landing Gear: Once you're airborne, immediately tap the *Gear* key to retract your landing gear. Don't leave the gear down — high speeds can rip off your landing gear.

Retract Flaps: Tap the *Flaps* key to retract your flaps. You no longer need the extra lift. Again, high speeds can rip off the flaps, causing serious damage to your wings.

Flying to the Target

Level Flight: Once airborne your first step is to achieve level flight. Push the control stick forward or back until the horizon is level across the middle of the HUD. Then make fine adjustments until the round flight path indicator (on the HUD) cuts through the middle of the horizon and you're neither gaining nor losing altitude.

Don't confuse the nose indicator with the flight path indicator (see illustration on page 34). Always use the flight path to aim your plane (even though the indicator bounces around some). Do not use the nose indicator, since a plane's nose and its flight path rarely point in exactly the same direction!

Since this is a stealth mission, you want level flight at 500' to 1,000'. Look at the altimeter (strip gauge on the right side of the HUD). If you're above the 1k mark (1,000') you're too high. Push the nose down into a gentle dive until you reach the desired altitude. Then level out and again place the flight path indicator on the horizon.

Flying on Course: Now it's time to get onto the right course. Look at the heading indicator across the top of your HUD, and the INS Direction Indicator (the small, bright triangle somewhere on the top of the scale). Turn toward the indicator. As you turn the triangle moves toward the center; when the triangle is in the center of the scale you're "on course" to the first waypoint.

To turn, gently pull the stick left or right. The plane will bank. Release (center) the stick when the bank angle is about 45°. To increase the rate of turn you can pull back on the stick somewhat. As you do this, watch your speed (on the left of the HUD) and altitude (on the right). A turn with backpressure can slow your plane and rob you of lift, causing altitude loss.

Minimum safe speed varies with the current situation of your aircraft. A "stall indicator" bar will rise from the bottom of the speed scale when you travel too slowly. If this bar reaches the tick-mark in the center of the scale, your plane is stalling. In a stall the plane is no longer airworthy, and begins to fall out of control. Therefore, do not stall the plane.

If you do stall the plane, lower your nose to regain airspeed, then pull out into level flight.

Minimum safe altitude is about 200'. However, in this training mission stay at 500' above the ground.

Autopilot: If you're hopelessly confused about which direction to fly, and how to do it, just tap the *Autopilot* key. It will take over immediately, turning you onto the correct course. If you're below 500' the autopilot will climb to that altitude. If you touch the control stick the autopilot automatically turns off.

Enjoying the Flight: Once on course, enjoy yourself by trying out all the nifty viewpoints available. You can return to the cockpit at any time: just tap the *Cockpit* key.

You can see out the front, rear and sides of the cockpit canopy using the *View Ahead*, *View Rear*, *View Left* and *View Right* keys. These keys assume you are looking past the cockpit area. They give a nearly unobstructed view of the outside landscape. In mountain valleys and over urban areas the scene can be quite thrilling.

You can also step "outside" your aircraft and watch it using the *Chase Plane*, *Slot View*, and *Side View* keys. Bank the plane left and right to observe the difference between the chase plane (where you appear to be in a plane following in the "footsteps" of the F-19) and the slot (where you remain behind

the F-19 and always remain level). Although the chase plane is more visually exciting, the slot view is handy when learning aerobatics.

The *Tacti View, Invrs Tacti* and *Missile Views* are used in combat situations. See pages 31-33 for more detailed description of these options.

Passing the First Waypoint: When you reach the first waypoint you'll see a message in your HUD. Your INS system immediately switches to the next waypoint, which is your primary target. If it isn't (because you've accidentally changed the waypoints) just tap *Reset Way Pt*. This resets the waypoints to the starting default, with waypoint #2 at your primary target and waypoint #3 at the secondary target.

Extra Fuel: You'll notice that one of the four items in your weapons bay is an extra fuel tank. This is because the mission from the CV *America*, to Tripoli, and then to Sigonella in Sicily, is a very long trip.

To see your fuel status, tap the *Select Way Pt* key. The bar gauge across the bottom shows the fuel on hand. The dark area at the right end of the bar is fuel consumed already. The four bands in the middle represent the amount of fuel needed to reach each of the four waypoints. Fuel calculation is based on your current altitude and speed. The final band to the left represents the amount of spare (reserve) fuel available.

Your jet engines cannot draw fuel directly from the extra tank. They can only draw fuel from the regular, main tanks. Therefore, to use the extra fuel you must pump it from the extra tank into the main tank.

To accomplish this task, first tap the *Select Ordnance* key until the extra fuel is the current weapon. You can tell this by the text in the lower left corner of the HUD. You can also change the right-side CRT to display the weapons and highlight the current one by tapping the *Ordnance* key.

Now that fuel is selected, tap the *Fire Ordnance* key to "fire" the fuel from the spare into the main tank. If you tap the *Select Way Pt* key once more, you'll see the fuel status has changed.

Accelerated Time: If you find the journey somewhat dull, you can speed the passing of time by tapping the *Accel Time* key. This doubles the rate at which time passes. To return to normal time, simply tap the *Norm Time* key. Combat activity or landing automatically returns you to normal time.

Attacking the Target

Once you are well past the first waypoint and the coast of Libya is on the horizon, it's time to start thinking about the target.

Check the Tactical Situation: Switch your left-side cockpit CRT to the gridded tactical map (tap the *CRT Maps* key). Your target is a radar station, so look for a radar symbol on this map.

Acquire the Target: Switch your HUD to AIR-GROUND mode (tap the *HUD Modes* key until it comes up), then tap the *Cam Ahead* key. If your target doesn't appear in the right-side CRT, tap the *Select Target* key until it does. If you cycle through every targets and still don't see the primary, you're either too far away to see it or you're somehow flying in the wrong direction.

Select your Weapon: Tap the *Select Ordnance* key until the weapon in the lower left corner of the HUD reads "2 AGM-65D" and/or "2 Maverick".

Wait for Range, Altitude and Missile Lock: You'll notice that a box appears in the HUD. This is the "target box"; the target seen on the zoom TV CRT is in the middle of this box.

When you get within launch range for a missile this box changes to an oval shape. In addition, "Missile Lock" flashes on the right-side CRT.

The oval shape means your missile can hit if you attack at maximum speed. If you wait longer, eventually the oval changes color. This means the missile can hit regardless of your speed. Of course, if you fire the missile at an inappropriate target, it might hit but not cause damage — the ability of weapons to destroy targets is summarized on page 131.

It's important that you not launch a weapon too low. You may be caught in your own bomb blast, or a missile may hit the ground before its motor can power it up and away. A simple rule to get you started is that missiles and retarded bombs require at least 500' altitude, free-fall and laser bombs 3,000'.

Launch: When you have "Missile Lock", open the weapons bay (tap the *Bay Doors* key), then launch the missile by tapping the *Fire Ordnance* Key. After launching, turn away slightly, since flying through an exploding target could damage your aircraft.

Shortly thereafter the missile should hit the target. A successful hit causes a fire and sends a cloud of smoke up into the sky.

The Secondary Target: You can now fly to the secondary target and attack it as well, using the same procedure. Or, if you wish, you can call it quits and immediately start for home.

The Return Trip

Setting the INS to the Landing Point: Tap the *Reset Way Pt* key and then the *Select Way Pt* key. The reset way point insures that the default waypoints are now loaded in your INS (inertial navigation system).

Now examine the list of waypoints on the right-side cockpit CRT. There are four waypoints listed. If the bottom (fourth) point is not highlighted, tap the *Next Point* key until it is highlighted. This switches the INS and waypoints system to that point. The last point on the default list is always your return base.

Flying Home: You can either use the autopilot or manually fly the plane home. As before, guide yourself using the heading scale (horizontal scale at the top of the HUD). When the INS Direction Indicator triangle is lined up on the center of this scale, you're on course toward your home base.

If you look at the map, you'll notice there's a small island (Malta) just south of Sicily. You should steer just east (to the right) of Malta. As you near Malta, change your HUD to NAV mode (tap the *HUD Modes* key), then tap the *Cam Ahead* key. If the Sigonella airbase comes up on the right-side CRT, fine, this is your destination! However, it's likely that Halfar airfield on Malta will appear instead (since it's closer). Therefore, tap *Select Target* until Sigonella appears.

The Satellite/Radar map on the left side CRT may help you see this better. Tap the *CRT Maps* key if the tactical display (the gridded map) is still on the left-

side CRT. You can enlarge and reduce either map by tapping the *Zoom* and *UnZoom* keys.

Landing at Sigonella Airbase

About 50 km from Sigonella start lining up your approach for landing.

Level Flight: First achieve level flight at 500' to 1,000' altitude.

ILS: Next, turn on the ILS (instrument landing system) by tapping the ILS key. A horizontal and vertical bar appear on your HUD. These ILS symbols represent your position in relationship to the "glide slope". The glide slope is an invisible "beam" that angles out and up from the end of the runway. First you'll line up beneath this glide slope, and then follow it into the airbase, eventually intercepting the descending slope line and following it down to the end of the airstrip. For more information on ILS systems, see "Using the ILS" on page 42 and especially pages 52-53.

Line Up Your Approach: If the vertical bar is left or right of you HUD nose indicator, turn about 90° in that direction and fly until the bar start moving toward the center. Then turn toward Sigonella. You want to get back onto a course of 000° just as the bar centers on the HUD. However, don't worry if the bar is a little off center. As long as Sigonella is dead ahead the vertical bar will gradually creep toward the center. However, if the bar is moving away from the center, it's a sign you're travelling away from the glide slope — in that case turn the other way to correct the problem.

Reduce Speed: Now cut your throttle back to about 50% power (tap the *Decr* key a few times). Your speed will gradually decrease. To maintain level flight you'll have to pitch up your nose a bit (watch the altimeter on the right side of the HUD).

Extend Flaps: When your speed reaches about 300 kts, tap the *Flaps* key. This extends the flaps (notice that "FLAPS" appears on the HUD). This slows you further and gives you more lift. You'll have to readjust the nose a little to maintain level flight.

Lower Gear & Reduce Speed Again: Tap the *Gear* key to lower your landing gear. You can visually check that the gear is down by tapping the *Side View* key. Return to the cockpit view by tapping the *Cockpit* key. You can also check this by the color of the "GEAR" light on the left side of the cockpit (see the Technical Supplement for the color key).

Now cut the throttle back to about 40% power. As your speed gradually decreases you'll have to raise the nose to maintain level flight. By this time you should be close to the glide slope, and travelling about 200 to 250 kts with your speed still decreasing.

If you're moving too fast, tap the *Brakes* key (to open your air brakes), then a few seconds later tap it again to close the airbrakes. Do not leave the airbrake open, it may cause you to stall and crash later.

Intercept the Glide Slope: As you get near the airfield, the horizontal ILS bar begins to move downward on the HUD. When the bar approaches the HUD nose indicator center (the middle of the HUD), pitch your nose down a little.

Your objective is to go into a gradual descent that keeps the bar centered in the middle of your HUD (crossing the center of the HUD nose indicator). To avoid gaining speed in the descent, reduce your power (*Decr* key) a tap or two.

As the airstrip comes up, first check your speed. You should be travelling 150-200 kts, or decreasing from 250 kts toward 200 kts.

If your speed is above 250 kts, you're coming in too "hot" (too fast). Go to maximum throttle (tap *Max Pwr*), retract your landing gear and flaps, and try again: fly to Malta, turn around there, and start over.

If your speed is too slow, look at the stall bar (the colored bar rising from the bottom of the airspeed gauge). If the stall bar is close to the middle of the scale, you're getting into trouble. Tap the *Incr* power key once or twice.

Touch Down: If your speed is correct (150-200 kts), start watching the altimeter. It should be at 300' to 100' and decreasing. Make small adjustments with the control stick to keep the descent rate steadily, but not too fast. The runway is at 0' altitude. When you hear the squeal of your wheels on the pavement, tap the *Brakes* key instantly, then shut off the engines by tapping the *No Pwr* key. You've just made a safe landing.

The Second Mission

On your second practice mission it's time to learn about enemy radars, aircraft and missiles. Select exactly the same options as the first mission — you'll fly the same strike against a Tripoli radar station, but now you must worry about the enemy too.

Mission Planning: Before takeoff, check out the intelligence briefing in more detail. Highlight the *Radar Sites* option and select it. An overlay of concentric circles appears on the map. Each solid circle is a doppler radar, each dotted circle a pulse radar. Moving the *Controller* left and right cycles through each radar station, giving you additional data.

This screen helps you plan a route to Tripoli and back. Remember, the waypoints in your airplane are the default route shown on the map. You may wish to fly a different route, to evade enemy detection as much as possible.

Basically, you avoid detection by doppler radars if you arc around them, keeping a constant range to the radar. You avoid detection by pulse radars if you fly directly toward or away from them. For more information about this see "Radar & Stealth, Stealth Tactics" starting on page 76.

When you're done, you should have a mental "map" in your head of where enemy radars are, how you'll fly through them to avoid detection, and what weapons you'll use where to achieve your objectives.

Adjusting Waypoints: After you select *Begin Mission*, but before you take off, you may wish to adjust the waypoints to fit your new mission plan. The first waypoint, by default, is half way between your takeoff point and the primary target. Most pilots adjust this point.

To make adjustments, first tap the *CRT Modes* key until the colored satellite map appears on the left-side cockpit CRT. Then tap the *Change Way Pt* key to

display the waypoints list on the right-side CRT (and, incidentally, the waypoints course plan on the left-side CRT). Use the *Adjust Waypoints* keys to move the waypoint around the map. Notice that the course lines automatically "snap" to the new waypoint as you move it. If you don't like your adjustments, just tap *Reset Way Pt*. This resets all the waypoints to the initial default.

Default waypoint settings always are:

Waypoint #1: halfway between takeoff point and primary objective.

Waypoint #2: the primary objective.

Waypiont #3: the secondary objective.

Waypoint #4: the landing point.

Flying to the Target: After take off, as you fly to the target, watch the radar patterns on the satellite/radar map (on the left-side CRT).

Enemy radar signals are displayed graphically. Dotted arcs are pulse radars, solid arcs are doppler radars. Ground search radars are entire 360° circles, while ground fire-control tracking radars are short arcs. Aircraft radars, search or fire-control, are short arcs (except for AWACS aircraft that have an entire 360° circle).

Missiles and aircraft also appear on this map as color-coded dots. See the Technical Supplement for details.

You'll notice that enemy aircraft with their forward-facing radars may complicate your original plan for penetrating enemy air defenses. You'll have to sneak behind or underneath the enemy.

Flying Stealthy: Now that you understand the situation, it's time to watch the EMV (electro-magnetic visibility) scale.

The "visibility" of your plane to enemy radar appears as a bar rising from the bottom of this gauge. Your visibility increases as you climb to higher altitudes, increase speed, open bay doors, lower gear, or use jammers.

The bars coming down from the top of the scale are incoming enemy radar signals. Ground-based radars appear on the left, aircraft radars on the right. The bar color represents whether the radar sees you or not (see the Technical Supplement for a color key). Bar colors match the radar arc colors that appear on the Satellite/Radar map (on the left-side CRT).

You want to fly low (about 200') to keep your EMV small. You want to fly toward or away from pulse radars (especially the strongest!), and fly at a constant distance (arcing around) doppler radars. This keeps the enemy signal weak (i.e., reduces the size of their "bars" coming down the gauge).

Warnings

Eventually, though, you may make a mistake, or a previously silent enemy radar may suddenly turn on. Even if enemy radars don't see you, a successful attack always alerts them.

Search Warning: Enemy search radar detects your plane when the enemy radar strength bar overlaps your EMV bar.

Search detection means that enemy fighters are vectored toward your location, and that any surface-to-air missile (SAM) batteries in the area start

tracking you as a target.

Tracking Warning: Long-range and medium-range SAMs must track a target with radar before firing. Tracking radar appears as a short, narrow arc on the Satellite/Radar map.

When the enemy tracks you, the "TRAK" warning is lighted in the cockpit.

Some short range enemy missiles do not use a radar tracking system. Therefore, "TRAK" is not a foolproof warning of impending attack.

Missile Warning Lights: If a radar-homing missile is launched toward you, the "R" missile warning light flashes in the cockpit. If an IR (infrared) homing missile is launched toward you, the "I" missile warning light flashes.

The appropriate light continues to flash as long as the missile is homing on your plane. If jammers or some other device confuse the missile, the light goes off. If the missile later finds you again and starts homing once more, the light begins flashing again.

If two or more missiles of the same type are homing on you, that light continues to flash as long as any missile is homing.

Missile warning lights are very important, since they're the only way to tell what kind of missile is attacking. The type of attacking missile (radar or infrared) determines what sort of defenses you should use.

Missile Proximity Klaxon: When a missile approaches within a few seconds flight time of your plane, the proximity klaxon goes off. This very loud signal means you must do something, immediately, or you'll be hit. Typically you'll drop a chaff or flare cartridge, depending on the type of threat (chaff for radar missiles, flares for IR missiles). However, you can also attempt some last-second maneuvering.

Missile Defenses

When the TRAK or missile warning lights go off, it's time to warm up your missile defenses, since an attack is incoming.

Understand the Attack: The first step is to check out the attack. Switch the left-side cockpit CRT to the tactical display (tap the *CRT Maps* key). Use the *Zoom* and *UnZoom* keys until the you find a useful scale. Missiles are small color-coded lines (see the Technical Supplement for a color key).

Disappearing: If you're attacked by radar-guided missiles (either the "TRAK" light is on, or the "R" missile warning is lighted), you can evade the attack by reducing your EMV or lowering the enemy radar's effectiveness (or both). If the enemy radar loses sight of you, the missile loses guidance and flies on blindly.

Decoys: Your F-19 carries only three decoys. To launch a decoy, tap the *Decoy* key. The "DCY" light in the cockpit turns on, and remains lighted while the decoy is running.

Each decoy is a computer-controlled "imitation" of your aircraft that is easier for the enemy to detect and lock onto. Enemy missiles, aircraft and radars will follow the decoy, thinking it's you. Meanwhile you can pour on the speed and escape. Eventually the enemy will discover the ploy and start

looking for you again. The amount of time varies with the skill of the enemy. The "DCY" light in the cockpit remains lighted while the decoy is functional.

Jammers: Use the ECM jammer against radar-guided missiles (missiles that light the "R" warning). Tap the *ECM* key to toggle the ECM jammer on and off.

Use the IR jammer against IR guided missiles (those which light the "I" warning). Tap the *IR Jammer* key to toggle the IR jammer on and off.

After you turn on the jammer, change to a different course and get away from the missile. If you don't, when you turn off the jammer (or when an advanced missile gets close enough to "burn through" your jammer), the missile starts homing on you again! Advanced missiles that "burn through" jamming include semi-active radar missiles, command guidance radar missiles, and second generation IR missiles.

Don't leave your jammers running. The ECM jammer increases your EMV, while the IR jammer reduces your speed. In addition, the IR jammer can overheat, causing it to automatically shut down until it cools off.

Chaff and Flares: A chaff or flare cartridge decoys a missile for two or more seconds. During that time the missile flies toward the chaff (if a radar homing missile) or the flare (if an IR homing missile).

Fire a chaff cartridge (tap the *Chaff* key) when a radar-guided missile sets off your missile warning klaxon and "R" warning light.

Fire a flare cartridge (tap the *Flare* key) when an infrared or visually guided missile sets causes off your missile warning klaxon and "I" warning light.

Maneuvering: Missiles only have a 45° forward "view". If you're outside of this arc, the missile cannot track you. Therefore, if you "blind" the missile with a decoy, jammer, chaff, or flare, then fly outside its arc, the missile may lose you and fly away. Some missiles, unfortunately, can circle around for another pass.

Missiles also have very wide turning circles. You can "turn inside" a missile, causing it zoom past you. See "Outmaneuvering a Missile" on page 00 for more details.

Advanced Combat: Weapons & Techniques

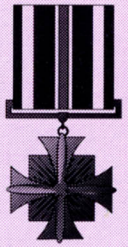
You'll want to try various weapons against land and air targets on this mission.

To learn the more about weapons, read the "Weaponry" section on pages 43-45. Then turn to "How to Fight" on pages 56-63 for more details and specific instructions. Additional background and sophisticated tactics are explained in "Air-to-Ground Tactics" (pgs 78-88) and "Air-to-Air Tactics" (pgs 89-97).

The Data Charts, on pages 129-134, provide a useful summary of various weapons, including which is most effective against which type of target.

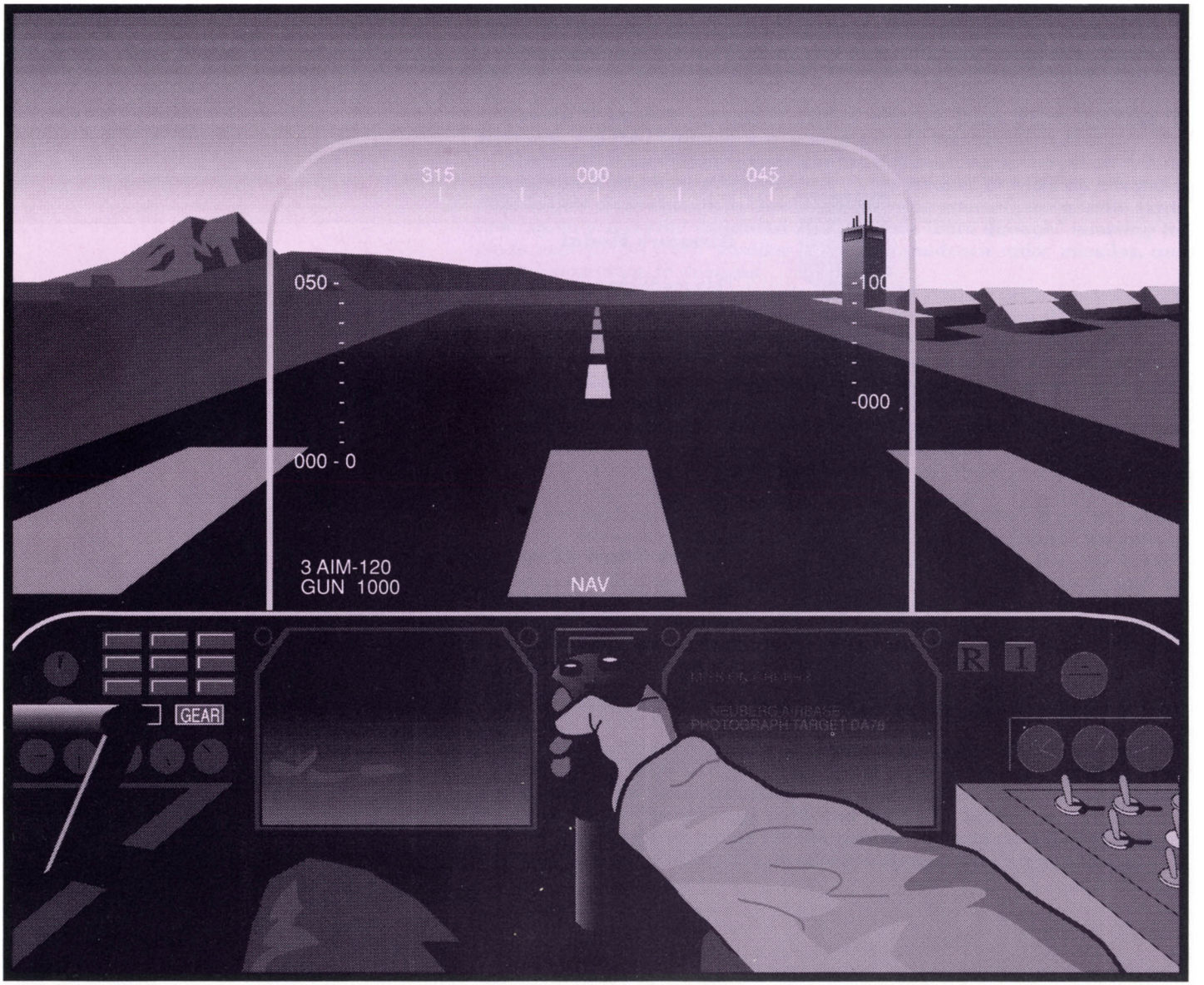
Airman's Medal

This medal is commonly awarded for heroism that involves the voluntary risk of life under conditions other than those of conflict with an opposing armed force.



Distinguished Flying Cross

This medal is awarded for heroism or extraordinary achievement while participating in aerial flight, including valorious performance in combat.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